

the sequence selected from the group (E/D)-X-(K/R)-(L/I/V/F)-X-(L/I/V/F), (E/D)-X-(K/R)-(L/I/V/F)-(L/I/V/F), (E/D)-X-X-X-X-(E/D)-X-(K/R)-(L/I/V/F), (E/D)-X-X-X-(E/D)-X-(K/R)-(L/I/V/F) or (E/D)-X-X-(E/D)-X-(K/R)-(L/I/V/F),

said compound being capable of binding to the NCAM Igl-Ig2 domains and of stimulating or promoting neurite outgrowth from NCAM presenting cells and/or proliferation hereof.

57. The compound according to claim 56, capable of binding to the NCAM Igl domain.

58. The compound according to claim 56, capable of binding to the homophilic binding site of the Igl-Ig2 domains which is constituted by the Igl domain.

59. The compound according to claim 56, wherein said compound is a fragment of the NCAM Ig2 polypeptide.

60. The compound according to claim 56, comprising the sequence K/R-K/R-X-K/R or K/R-X-K/R, wherein X is any amino acid, more suitably the sequence K/R-P-K/R, K/R-K/R-P-K/R, K/R-K/R-E-K/R or K/R-K/R-E-K/R, even more suitably the sequence K-P-K, K-K-P-K, K-K-E-K or K-K-E-R and most suitably the sequence A-S-K-K-P-K-R-N-I-K-A (SEQ ID NO:1), A-K-K-E-R-Q-R-K-D-T-Q (SEQ ID NO:2), or A-R-A-L-N-W-G-A-K-P-K (SEQ ID NO:3).

61. The compound according to claim 56, having the sequence A-S-K-K-P-K-R-N-I-K-A (SEQ ID NO:1), A-K-K-E-R-Q-R-K-D-T-Q (SEQ ID NO:2), or A-R-A-L-N-W-G-A-K-P-K (SEQ ID NO:3).

62. The compound according to claim 60, being identical to a part of the NCAM Ig2 domain.

63. The compound according to claim 60, being a fragment of the NCAM Ig2 domain.

64. The compound according to claim 60, capable of binding to the NCAM Ig2 binding site on the NCAM Ig1 domain.

65. The compound according to claim 60, capable of binding to a binding site on the NCAM Ig1 domain, wherein the binding site is different from the NCAM Ig2 binding site.

66. The compound according to claim 65, wherein the number of amino acid residues in the sequence of the binding motif is within 12 amino acid residues.

67. The compound according to claim 63, wherein the peptide comprises the sequence (K/R)-X-(E/D)-(L/I/V/F)-X-(L/I/V/F), (K/R)-X-X-X-(K/R)-X-(E/D), (K/R)-X-X-(K/R)-X-(E/D) or (K/R)-X-(L/I/V/F)-X-(L/I/V/F), wherein X is any amino acid residue, more suitably the sequences (K/R)-X-X-X-(K/R)-X-(E/D)-(L/I/V/F), (K/R)-X-X-(K/R)-X-(E/D)-(L/I/V/F) or (K/R)-X-X-X-(K/R)-X-(L/I/V/F), even more suitably the sequences (K/R)-X-X-(K/R)-X-(E/D)-(L/I/V/F)-X-(L/I/V/F), (K/R)-X-X-X-(K/R)-X-(L/I/V/F)-X-(L/I/V/F) or (K/R)-X-X-X-(K/R)-X-(E/D)-(L/I/V/F)-(L/I/V/F) and most suitably the sequence GRILARGEINFK (SEQ ID NO: 23).

68. The compound according to claim 67, having the sequence GRILARGEINFK (SEQ ID NO:23).

69. The compound according to claim 67, being a fragment of, or is identical to a part of the hemophilic binding site of the NCAM Ig1-Ig2 domain which is constituted by the Ig2 domain.

70. The compound according to claim 56, capable of binding to the NCAM Ig2 domain.

71. The compound according to claim 56, capable of binding to the homophilic binding site of the Igl-Ig2 domains which is constituted by the Ig2 domain.

72. The compound according to claim 56, wherein said compound is a fragment of the NCAM Igl polypeptide.

73. The compound according to claim 72, wherein the number of amino acid residues in the sequence of the binding motif is within 12 amino acid residues.

74. The compound according to claim 70, wherein the peptide comprises the sequence (E/D)-X-X-X-(E/D)-X-(K/R)-(L/I/V/F)-X-(L/I/V/F), wherein X is any amino acid residue, more suitably (E/D)-X-X-(E/D)-X-(K/R)-(L/I/V/F)-X-(L/I/V/F) or (E/D)-X-X-(E/D)-X-(K/R)-(L/I/V/F)-(L/I/V/F), even more suitably the sequences (E/D)-X-X-X-X-(E/D)-X-(K/R)-(L/I/V/F)-(L/I/V/F), (E/D)-X-X-X-(E/D)-X-(K/R)-(L/I/V/F)-X-(L/I/V/F) or (E/D)-X-X-X-(E/D)-X-(K/R)-(L/I/V/F)-(L/I/V/F), and most suitably the sequence GEJSVGESKFFL (SEQ ID NO: 26).

75. The compound according to claim 74, wherein the peptide has the sequence EJSVGESKFFL (SEQ ID NO: 26).

76. The compound according to claim 72, being a part of the homophilic binding site of the NCAM Igl-Ig2 domains which is constituted by the Igl domain.

77. Use of a compound comprising at the most 12 amino acid residues from the amino acid sequence of neural cell adhesion molecule (NCAM), or a fragment thereof, or a mimic thereof as defined in claim 1, capable of binding to the NCAM Igl-Ig2 domains and of stimulating or promoting neurite outgrowth from NCAM presenting cells and/or proliferation hereof.

78. The use according to claim 77, wherein said compound are for the use as a medicament.

79. The use according to claim 78, wherein said compound are for the manufacture of a medicament for treatment of normal, degenerated or damaged NCAM presenting cells.

80. The use according to claim 78, for the manufacture of a medicament for treatment comprising the stimulation of outgrowth from and/or proliferation of N-CAM presenting cells.

81. The use according to claim 78, for the manufacture of a medicament comprising treatment of diseases and conditions of the central and peripheral nervous system, of the muscles or of various organs.

82. The use according to claim 78, comprising treatment of postoperative nerve damage, traumatic nerve damage, impaired myelination of nerve fibers, post-ischaemic, e.g. resulting from a stroke, Parkinsons disease, Alzheimers disease, dementias such as multiinfarct dementia, sclerosis, nerve degeneration associated with diabetes mellitus, disorders affecting the circadian clock or neuro-muscular transmission, and schizophrenia.

83. The use according to claim 78, comprising treatment of diseases of muscles, including conditions with impaired function of neuro-muscular connections such as genetic or traumatic atrophic muscle disorders.

84. The use according to claim 78, comprising treatment of diseases of various organs, such as degenerative conditions of the gonads, of the pancreas such as diabetes mellitus type I and II, of the kidney such as nephrosis and of the heart, liver and bowel.

85. The use according to claim 78, comprising stimulation of the ability to learn and/or of the memory.

86. A pharmaceutical composition, comprising one or more of the compounds according to claim 56.

87. The pharmaceutical composition according to claim 86, wherein the compound is a fragment of the NCAM Ig1 peptide.

88. The pharmaceutical composition according to claim 86, wherein the compound is a fragment of the NCAM Ig2 peptide.

89. The pharmaceutical composition according to claim 86, wherein the compounds are formulated as multimers.

90. The pharmaceutical composition according to claim 86, characterised in that the compounds are formulated as dendrimers, such as four peptides linked to a lysine backbone, or coupled to a protein carrier such as BSA.

91. The pharmaceutical composition which comprises an effective amount of one or more of the compounds according to claim 56.

92. Use of a pharmaceutical composition as defined in claim 86, wherein the composition is in combination with a prosthetic device.

93. The use according to claim 92, wherein the device is a prosthetic nerve guide.

94. A prosthetic nerve guide which comprises one or more of the compounds according to claim 56.

95. Use according to claim 78, wherein said compound is an NCAM Ig1 fragment for treatment of diseases or conditions of the central and peripheral nervous system, such as postoperative nerve damage, traumatic nerve damage, impaired myelination of nerve fibers, postischaemic, e.g. resulting from a stroke, Parkinsons disease, Alzheimers disease, dementias such as multiinfarct dementia, sclerosis, nerve degeneration associated with diabetes mellitus, disorders affecting the circadian clock or neuro-muscular transmission, and schizophrenia; for treatment of diseases or function of neuromuscular connections, such as genetic or traumatic atrophic muscle disorders; or for treatment of diseases or conditions of various organs, such as degenerative conditions of the gonads, of the pancreas such as diabetes mellitus type I and II, of the kidney such as nephrosis and of the heart, liver and bowel.

96. Use according to claim 78, wherein said compound is an NCAM Ig2 fragment for treatment of diseases or conditions of the central and peripheral nervous system, such as postoperative nerve damage, traumatic nerve damage, impaired myelination of nerve fibers, postischaemic, e.g. resulting from a stroke, Parkinsons disease, Alzheimers disease, dementias such as multiinfarct dementia, sclerosis, nerve degeneration associated with diabetes mellitus, disorders affecting the circadian clock or neuro-muscular transmission, and schizophrenia; for treatment of diseases or conditions of the muscles including conditions with impaired function of neuro-muscular connections, such as genetic or traumatic atrophic muscle disorders; or for treatment of diseases or conditions of various organs, such as degenerative conditions of the gonads, of the pancreas such as diabetes mellitus type I and II, of the kidney such as nephrosis and of the heart, liver and bowel.

97. A prosthetic nerve guide, characterised in that it comprises a pharmaceutical composition according to claim 86.--